

The modern ontological natures
of the *Cairina moschata* (Linnaeus, 1758) duck.
Cases from Perú, the northern hemisphere,
and digital communities

Jorge GAMBOA

DIRECTEUR DE LA PUBLICATION : Bruno David,
Président du Muséum national d'Histoire naturelle

RÉDACTRICE EN CHEF / EDITOR-IN-CHIEF: Joséphine Lesur

RÉDACTRICE / EDITOR: Christine Lefèvre

RESPONSABLE DES ACTUALITÉS SCIENTIFIQUES / RESPONSIBLE FOR SCIENTIFIC NEWS: Rémi Berthon

ASSISTANTE DE RÉDACTION / ASSISTANT EDITOR: Emmanuelle Rocklin (anthropo@mnhn.fr)

MISE EN PAGE / PAGE LAYOUT: Emmanuelle Rocklin, Inist-CNRS

COMITÉ SCIENTIFIQUE / SCIENTIFIC BOARD:

Cornelia Becker (Freie Universität Berlin, Berlin, Allemagne)
Liliane Bodson (Université de Liège, Liège, Belgique)
Louis Chaix (Muséum d'Histoire naturelle, Genève, Suisse)
Jean-Pierre Digard (CNRS, Ivry-sur-Seine, France)
Allowen Evin (Muséum national d'Histoire naturelle, Paris, France)
Bernard Faye (Cirad, Montpellier, France)
Carole Ferret (Laboratoire d'Anthropologie Sociale, Paris, France)
Giacomo Giacobini (Università di Torino, Turin, Italie)
Véronique Laroulandie (CNRS, Université de Bordeaux 1, France)
Marco Masseti (University of Florence, Italy)
Georges Métaillé (Muséum national d'Histoire naturelle, Paris, France)
Diego Moreno (Università di Genova, Gènes, Italie)
François Moutou (Boulogne-Billancourt, France)
Marcel Otte (Université de Liège, Liège, Belgique)
Joris Peters (Universität München, Munich, Allemagne)
François Poplin (Muséum national d'Histoire naturelle, Paris, France)
Jean Trinquier (École Normale Supérieure, Paris, France)
Baudouin Van Den Abeele (Université Catholique de Louvain, Louvain, Belgique)
Christophe Vendries (Université de Rennes 2, Rennes, France)
Noëlie Vialles (CNRS, Collège de France, Paris, France)
Denis Vialou (Muséum national d'Histoire naturelle, Paris, France)
Jean-Denis Vigne (Muséum national d'Histoire naturelle, Paris, France)
Arnaud Zucker (Université de Nice, Nice, France)

COUVERTURE/COVER:

Canard *Cairina moschata* (Linnaeus, 1758) de Moyobamba, San Martín, Pérou (photo Shirley Freyre)./*Cairina moschata* (Linnaeus, 1758) from Moyobamba, San Martín, Perú (photo Shirley Freyre).

Anthropozoologica est indexé dans/*Anthropozoologica is indexed in:*

- Social Sciences Citation Index
- Arts & Humanities Citation Index
- Current Contents - Social & Behavioral Sciences
- Current Contents - Arts & Humanities
- Zoological Record
- BIOSIS Previews
- Initial list de l'European Science Foundation (ESF)
- Norwegian Social Science Data Services (NSD)
- Research Bible

Anthropozoologica est distribué en version électronique par / *Anthropozoologica is distributed electronically by:*

- BioOne® (<http://www.bioone.org>)

Anthropozoologica est une revue en flux continu publiée par les Publications scientifiques du Muséum, Paris, avec le soutien du CNRS.

Anthropozoologica is a fast track journal published by the Museum Science Press, Paris, with the support of the CNRS.

Les Publications scientifiques du Muséum publient aussi / The Museum Science Press also publish:

Adansonia, *Zoosystema*, *Geodiversitas*, *European Journal of Taxonomy*, *Naturae*, Cryptogamie sous-sections *Algologie*, *Bryologie*, *Mycologie*.

Diffusion – Publications scientifiques Muséum national d'Histoire naturelle

CP 41 – 57 rue Cuvier F-75231 Paris cedex 05 (France)

Tél.: 33 (0)1 40 79 48 05 / Fax: 33 (0)1 40 79 38 40

diff.pub@mnhn.fr/<http://sciencepress.mnhn.fr>

© Publications scientifiques du Muséum national d'Histoire naturelle, Paris, 2019

ISSN (imprimé/print): 0761-3032 / ISSN (électronique / electronic): 2107-08817

The modern ontological natures of the *Cairina moschata* (Linnaeus, 1758) duck. Cases from Perú, the northern hemisphere, and digital communities

Jorge GAMBOA

Escuela de Arqueología UNASAM
Ciudad Universitaria, P-02002 Shankayán Huaraz (Perú)
jgamboavelasquez@yahoo.com

Submitted on 7 March 2019 | Accepted on 27 June 2019 | Published on 27 September 2019

Gamboa J. 2019. — The modern ontological natures of the *Cairina moschata* (Linnaeus, 1758) duck. Cases from Perú, the northern hemisphere, and digital communities. *Anthropozoologica* 54 (13): 123-139. <https://doi.org/10.5252/anthropozoologica2019v54a13>. <http://anthropozoologica.com/54/13>

ABSTRACT

Now a global inhabitant, the Muscovy duck *Cairina moschata* (Linnaeus, 1758) was domesticated millennia ago by Pre-Columbian indigenous societies of America. Driven increasingly afar by humankind, the expansion of this species is an example of the successful dispersion of an animal known for its adaptability and resilience. This article examines various cases of husbandry, reproduction, and uses of *Cairina moschata* in the north and central coasts of Perú, Mexico, and North America. This exercise permits us to identify the various ways in which humans approach this versatile, charismatic, and always independent bird raised for its meat, unique behavior, or quality as companion animal or pet. As a hybrid animal, the Muscovies can also withstand extreme food conditions aimed to transform the mestizo duck in special human food. *Cairina moschata* ducks are a sign of belonging, tradition, innovation, and economy in Perú, Mexico, the United States, and digital communities. This analysis, in addition to allowing us to identify patterns, distinctions, and paths to new forms of human-animal relationships, permits us to explore a broader approach to the construction of the ontological nature and agency of an animal whose existence appears interwoven with our own.

KEY WORDS

Multispecies ethnologies,
ontology,
ducks,
human-animal
relationship,
breeding,
captivity.

RÉSUMÉ

Les natures ontologiques modernes des canards Cairina moschata (Linnaeus, 1758). Cas du Pérou, de l'hémisphère nord et des communautés digitales.

Domestiqué il y a des millénaires par les sociétés précolombiennes indigènes d'Amérique, le canard musqué *Cairina moschata* (Linnaeus, 1758) est à présent mondialement connu pour ses capacités d'adaptation et pour sa résilience. Cet article examine plusieurs cas d'élevage, de reproduction et d'utilisation du canard musqué sur les côtes nord et centrale du Pérou, au Mexique et en Amérique du Nord. Cette étude permet d'identifier les diverses manières dont l'être humain se rapproche de cet oiseau polyvalent, charismatique et toujours indépendant, élevé pour sa viande, son caractère unique ou pour ses qualités d'animal de compagnie. Les canards de type *Cairina moschata* sont un signe d'appartenance, de tradition, d'innovation et d'économie au Pérou, au Mexique, aux États-Unis et dans certaines communautés numériques. En tant qu'animal hybride, le canard musqué peut également subir des conditions extrêmes destinées à le transformer en un produit alimentaire spécialement conçu pour l'homme. Outre le fait d'identifier des schémas, des différences et des voies amenant à de nouvelles formes de relations homme-animal, cette analyse nous permet d'explorer une approche plus large de la construction ontologique de la nature et de l'agentivité d'un animal dont l'existence apparaît comme intimement liée à la nôtre.

MOTS CLÉS

Ethnologies
multispécifiques,
ontologie,
canards,
relation homme-animal,
élevage,
captivité.



Cairina moschata

FIG. 1. — Adult joque drake *Cairina moschata* (Linnaeus, 1758). Drawing by Jorge Gamboa after Ortiz de la Puente (1952).

INTRODUCTION

On the north coast of Perú, during the middle of the first millennium AD, a Moche artist modeled in clay the sculpture of a humanized duck ready for battle (Uceda 1997). The Moche (AD 100-800) had a special interest in the domesticated duck *Cairina moschata* (Linnaeus, 1758) and its wild cousins, picturing them in sculpted or painted ceramics, some showing those birds being carried in the arms of priests, like living offerings (Benson 1976). Human fascination with waterfowl was not exclusive to ancient America. A thousand years earlier, narrators and dramaturges from Greek city-states popularized the tale of the intimate encounter between Zeus, embodied in a swan, and Leda, a mortal woman; the eroticism of that episode appears in a mural painting recently uncovered in Pompeii. Unlike a previous essay focused on the symbolism of ducks among the ancient Moche peoples (Gamboa 2017), I analyze here the present day relationships between human populations and the Muscovy. This paper explores the traditional and modern practices of breeding, consumption, and management of the *Cairina moschata* duck in both rural and peripheral urban environments from the northern and central Peruvian coasts; next, the position of the *Cairina* in the

rural world and food industry of México, United States, and Europe is examined. Another issue treated in this review of the modern ontological values attributed to the *Cairina moschata* is the recognition of its role in some digital communities active in the northern hemisphere. The analysis will permit an examination of the variability and dynamism of meanings attributed in different parts of the contemporary world to one of the birds domesticated in the Neotropics.

MULTISPECIES ETHNOGRAPHIES AND HUMAN-ANIMAL RELATIONSHIPS

Paraphrasing Martínez-Lira & Corona (2016: 632), the original distribution area of the *Cairina moschata* duck is unknown because of the strong influence of early human activities. The lives of *Homo sapiens* and the Neotropical indigenous crested duck continue to be interlocked today. This examination starts from a multispecies ethnological approach oriented to understanding the human-animal relationships but also recognizing animals as beings with their own agency (Kirksey & Helmreich 2010: 545). This perspective responds to a conceptual turn aimed at expanding the epistemological basis of anthropology



FIG. 2. — Pen of *Cairina moschata* (Linnaeus, 1758) in the home of Sr. Germán Llupton, Nepeña, Perú (photo Jorge Gamboa).

to a broader spatial and biological field, activated through the continuous entanglement between human society and nature (Kohn 2007: 4; Haraway 2008; Van Dooren *et al.* 2016). Yet by definition, this manner of understanding the world sees “human” society as the continuous flow of capacities and efforts of multiple organisms and of both human and non-human forces. Ecological concerns about the destiny of the planet in the face of anthropogenic alterations that threaten to degrade our shared environments – far from being recent, as mentioned by Kirksey & Helmreich (2010: 549) – also inform this perspective.

Reflection on the course of anthropology includes research on the connectivities that provide meaning to the association between the earth and human societies (and places). Under this theoretical (re)vision, the *Cairina moschata* can be seen as a social being with agency and efficacy that, along with interacting and being part of the political and biographical life of humans, becomes a subject of ethnozoological and anthropological study in its own right (Kirksey & Helmreich 2010: 554; Van Dooren & Rose 2016: 81). The approach of human society to domesticated animals shows a series of alterities, idealizations, and subordinations with cultural and ethical components constantly under reconstruction and reinterpretation. Human-animal association reveals itself as a dynamic coexistence obliging us to reassess categories, boundaries, and dependences (Rose *et al.* 2012). Van Dooren *et al.* (2016: 16) defined this perspective as an assay of the attentiveness to animal others (and their histories), designed to understand better our/their encounters and to create new relations and explanations about the lines of contact between human and non-human beings.

MORPHOLOGY, BEHAVIOR, EXPANSION

The *Cairina moschata* duck (family Anatidae) is a Latin American relative of the domestic and wild waterfowl from Eurasia, Africa, and Oceania. This bird has received diverse names throughout history: *fellum* or *fellu* (in colonial times) and *joque* on the northern coast of Perú, *ñuñuma* in quechua, *ipeg* in guaraní, *real* or *criollo* from Ecuador to México, *xomotl* in nahuatl, *pato real*, *perulero*, *alas blancas*, *pinto*, or *solareno* in modern México (Monterrubio-Rico 2006: 2), *canard de Guinée* and *canard musqué* in France, and *muscovy* in Europe and North America. The term *Cairina moschata* can be considered the most tenacious – or adequate – survivor of the names given in Europe: *Anas indica*, *Anas libica*, and *Anas moschata*. Muscovy ducks exhibit sexual dimorphism: adult drakes (up to seven kilograms in the domestic state) are almost double the volume and weight of females – being larger than Rouen and Cayuga ducks of European origin (Avilez & Camiragua 2006; Narbaiza 2008). Adult domestic *Cairina moschata* develop large red or black caruncles around the eyes and the beak’s base (Johnsgard 2017: 29, 31); that feature is more conspicuous in males, who also present a crest of feathers on the top of the head (Figs 1; 2). The beak is wide and of slightly “smiling” appearance. Long and flat, the tail tends to “twitch” horizontally from side to side. Wings are developed enough to permit flying. The domestic duck of the Neotropics is less noisy than other waterfowl, emitting a characteristic low sound (*hiss hiss*). Daring and inquisitive, never submissive in front of humans, the *Cairina moschata* can be considered a charismatic animal. Highly territorial, drakes fight with

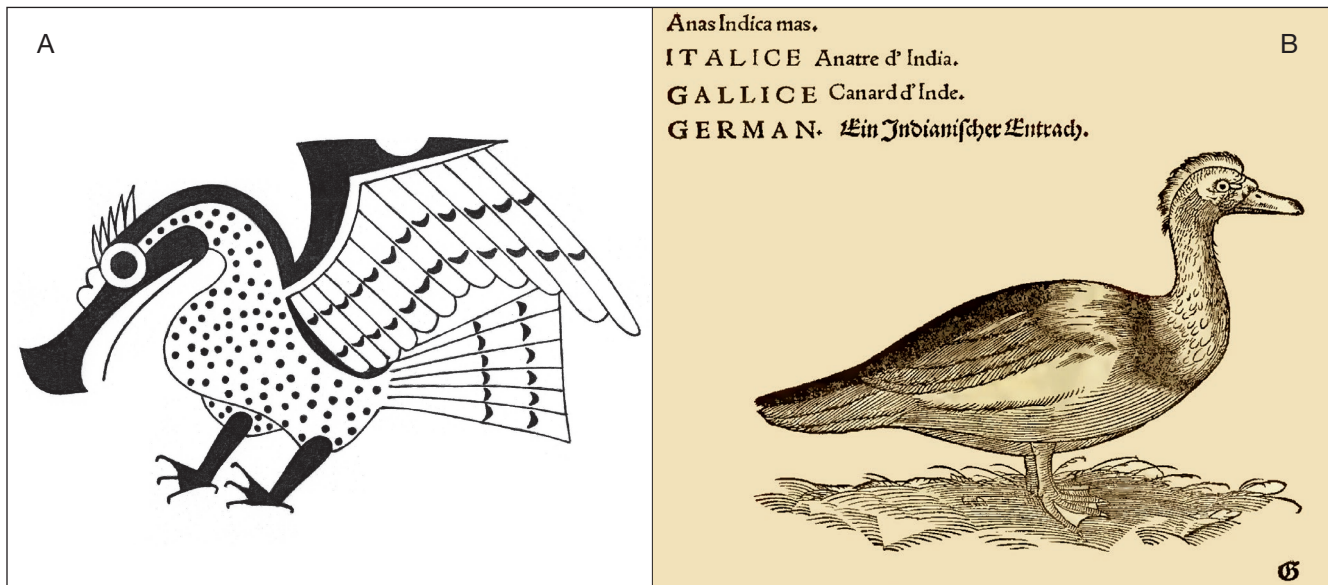
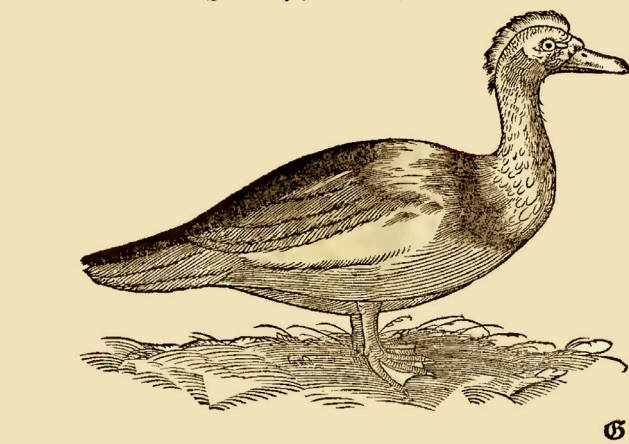


FIG. 3. — *Cairina moschata* (Linnaeus, 1758) represented by Andean and European artists: **A**, Moche painted pottery (AD 100-800), original vessel at Museo Larco, Perú; **B**, illustration by Johan Konrad Gessner (1560: 73).

rivals using their beak and wings; also, they are polygamous, or promiscuous, showing a passionate sexual conduct with frequent displays and mating both on land and in the water. Courtship of females includes moments of vocalization, tail wagging, and, among drakes, erection of the crest. Hen and drake *Cairina* preen themselves frequently; drakes can stretch their neck and tail vertically at the same time (Johnsgard 1965: 100). The nails, or claws, of the *Cairina moschata* reveal its nature as a perching animal.

Cairina moschata can form temporary pairs during reproductive periods. Drakes sometimes guard the nest, removing rivals and intruders. In its domestic state, *Cairina* ducks can live up to 20 years. Sexual maturity of drakes and females is reached by 24 to 28 weeks. Nesting occurs every five months. In its wild state, the *Cairina* duck shows preference for flooded woodlands and warm and humid weather but, as we will see later, it also exhibits an outstanding capacity for adaptation to cold ecosystems. Wild *Cairina moschata* nest in tree depressions, three to 20 m above the ground; those domesticated or that have returned to a wild environment nest on the ground and in shallow holes (Phillips 1922-1926; Eitnienar *et al.* 1998; Johnsgard 2010: 166). Domestic specimens adapt easily to freedom in the wilderness, becoming feral birds. In domestic birds, plumage acquires a wide range of colors that goes from totally white to a combination of grey, brown, and green; wild Muscovies are less colorful and have dark feathers. *Cairina* ducklings have yellow plumage with brown parts in the tail, wings, and head. There are differences in conduct between wild and feral groups, with the first living in smaller bands, while feral ducks form larger flocks (Johnson & Hawk 2012: 2). The diet of *Cairina moschata* is omnivorous, including vegetation, seeds, invertebrates, small fishes (caught opportunistically instead of while diving) and small reptiles. The taste of Muscovies for insects led some

Anas Indica mas.
ITALICE Anatre d' India.
GALLICE Canard d' Inde.
GERMAN. Ein Indianischer Entsch.



human indigenous and mestizo communities of Amazonia to employ them, together with other birds, as *cucaracheros* or bug-eaters (Angulo 1998: 31, 32).

The *Cairina moschata* does not show a remarkable natural migratory range. However, wild and semi-domestic Muscovy populations in America have a wide distribution that includes the Lower Río Grande, the Pacific and Caribbean coasts of México and Central America, Panamá, northern Colombia, Amazonas, Orinoco and Paraná basins, northwestern Ecuador, and Chaco. The earliest evidence in the Americas of human consumption of *Cairina moschata* dates from the late Pleistocene (Wetmore 1956). The domestication of *Cairina moschata*, from multiple centers or from a more restricted area, could have taken place in the tropical lowlands of South America during the last millennia before our era (Donkin 1989; Stahl *et al.* 2006: 661; Stahl 2008: 123). Initial steps of the Muscovy taming process could take the form of a commensalism witnessing the coming of wild *Cairina* to human settlements in order to take advantage of middens with organic waste (Zeder 2012: 240, fig. 9.7); those early stages of coexistence between ducks and human communities would have been followed by stages of habituation, association and, finally, controlled reproduction.

Domestication did not change just the behavior of *Cairina*. The “original” ontology of the species – formed by natural adaptations to the forest/wetland ecosystems – would experience successive transformations built around its interaction with human communities. The physical appearance of domestic *Cairina* is now more robust, especially in drakes. Wild specimens, slender and of dark coloration, are elusive and avoid proximity to potential predators, including humans. *Cairina moschata* was domesticated – in the active sense of accepting human presence and taking advantage of the food and shelter offered – yet, several millennia later, it preserves predisposition to abandon its domestic status.

Certainly, evidence of the location of early domestication areas of the *Cairina moschata* are yet scant or elusive (Angulo 1998: 25, 35; Stahl 2008: 123). Remarkable evidences of early taming, breeding and consumption of Muscovies come from the eastern lowlands of Bolivia, at the Pailón (Prümers & Winkler 1997; Prümers 2002) and Loma Salvatierra sites. Dated to AD 600-1400, Loma Salvatierra contained bone remains of *Cairina* with traces of forced extraction of wing feathers and lashing of feet for long enough to produce detectable pathologies (Driesch & Hutteter 2012: 361, 362, 365, figs 15, 16). The zooarchaeological analysis of sites from the Upper Amazonas, the Marañón Basin, and the north coast of Perú – all with evidences for early socioeconomical complexity and extensive regional exchange networks – could be crucial to determine the chronology of the *Cairina moschata* introduction in the western regions of South American. Another region with data on human use of *Cairina* is Ecuador, mainly for the Guangala Phase (100 BC-AD 800) at Salango and settlements of the Milagro-Quevedo/Chono societies from AD 900 to the early colonial period (Hesse 1980; Stahl & Norton 1987; Stahl *et al.* 2006: 658, 660). During the first millennium AD, Moche people and neighbor societies in North Coast of Perú could domesticate the Muscovy, which was represented in ceramics used in feasting and burial rituals (Gamboa 2017). The breeding of *Cairina moschata* in Perú's north coast would have been firmly established in the Chimú (AD 1000-1470) and Inca (AD 1470-1532) periods, when Muscovy ducks were a common motive in domestic and ritual ceramics; during the last period, *Cairina* husbandry – or a form of exploitation of wild Muscovies – could have expanded to the northern sierra of Argentina (Rodríguez 1992). The status of Muscovy in Andean and Amazonian South America is yet unclear for the colonial period (1532-1825); however, it is possible that management continued among the indigenous and mestizo societies¹. In the first decades of the 16th century, the *Cairina moschata* started the transatlantic journey, on Spanish and Portuguese galleons, that brought them to Europe; a process that started a new cycle, this time global, of geographical dispersion for the species (Fig. 3A, B).

Expansion of *Cairina moschata* beyond America's intertropical zone is a phenomenon both anthropic and natural. Carried by humans to the other side of the Atlantic, the American domestic ducks would successfully occupy European ecosystems, populating, under human control or on their own, cities and countryside from Spain to France and Russia (Donkin 1989; Crawford 1992). First printed mention of the Muscovy duck in Europe corresponded to the naturalist Pierre Belon (1555). Five years after, Johan Konrad Gessner (1560: 73) described and illustrated the American domestic duck in his book on the birds of the world. As time passed, the crested domestic duck from America would become a frequent, although peripheral, subject of painting at European courts of the 17th to 18th centuries. In the following centuries, the *Cairina* duck was brought to Africa (Banga-Mboko

1. In 1782-1785, Baltazar Martínez de Compañón y Bujanda, bishop of Trujillo in northern Perú, ordered the drawing of a clearly recognizable adult black Muscovy duck.

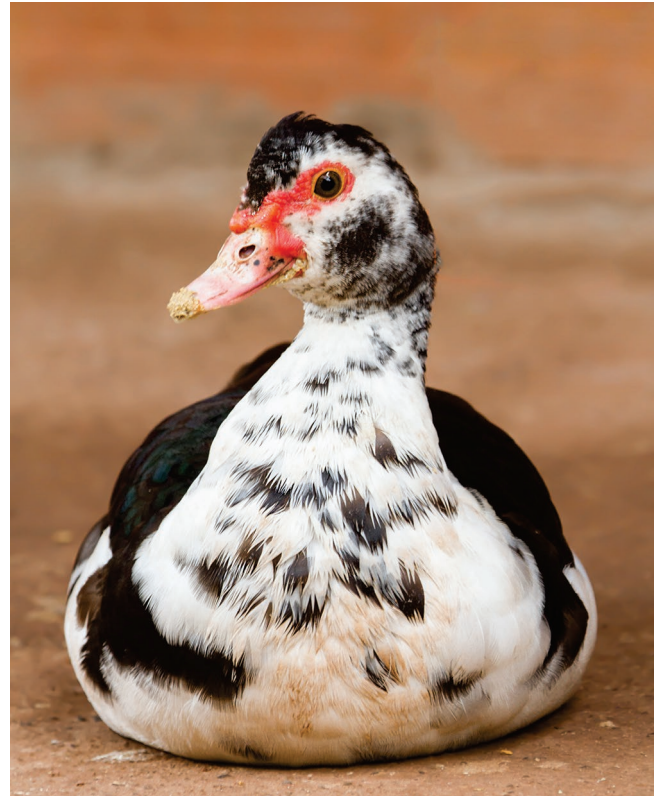


Fig. 4. — *Cairina moschata* (Linnaeus, 1758) from Moyobamba, San Martín, Perú (photo Shirley Freyre).

et al. 2007; Yakubu 2013). Eventually, the *Cairina moschata* would adapt to the cold weather, and seasonal snowfalls, in the United States, Canada, and the north of Europe; it would also flourish in South and Southeast Asian countries, being currently abundant in India, Vietnam, and China (Huang *et al.* 2012; Tu *et al.* 2014).

TRADITIONAL BREEDING AND CONSUMPTION OF JOQUE DUCK ON THE PERUVIAN COAST

In both prehispanic times and in the present, domestic *Cairina moschata* inhabit the Peruvian territory from the littoral zone (0-500 meters above sea level [masl]) to the western slopes of the Andean sierra (500-1500 masl). Although it is less frequent in the sierra, it can also be bred in elevations up to the 3300 masl. Muscovies reappear, in domestic as well as feral and wild states, in the upper and lower Peruvian rainforests on the eastern slopes of the Andes (Fig. 4). On the north and north-central coast of Perú, the Muscovy ducks (named traditionally as *joque* since, at least, the Republican period) were present and, apparently bred, from the first millennium before our era (Gamboa 2017).

This exploration of modern human-animal relationships on the north coast of the Peruvian Andes is based on surveys, interviews with breeders, and personal observations carried out by the author from 2015 to 2019 in Ancash, La Libertad, and Lambayeque regions. Localities of study were

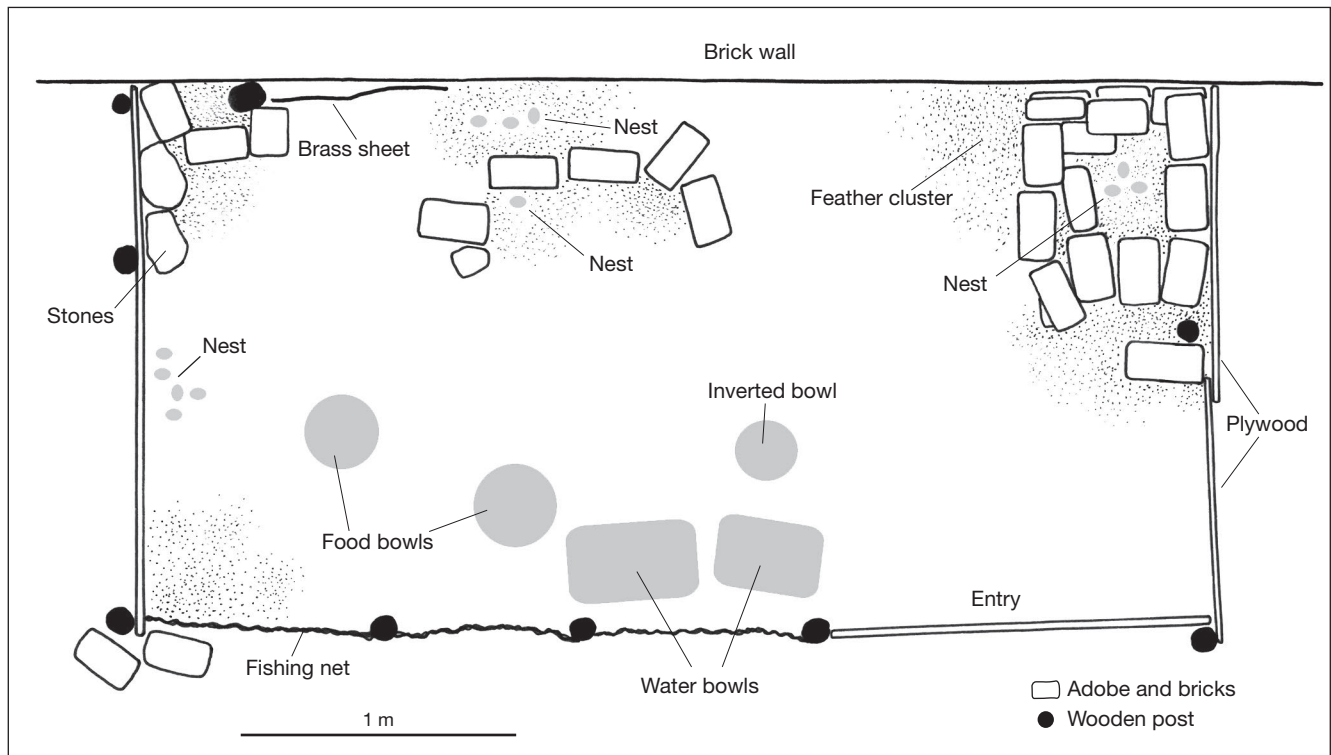


Fig. 5. — Ground plan of corral owned by Sra. Alcira Sachún near Chan Chan, Trujillo (drawing by Jorge Gamboa with assistance of Lucy Apaestegui).

Capellanía, Nepeña, Casma, Chimbote, and Huaraz (Ancash, seven breeders), Trujillo, Laredo, Cerro Blanco, and Chicama (La Libertad, eight breeders), and Chacupé and Chiclayo (Lambayeque, four breeders). The raising of *Cairina moschata* on the north and north-central coast of Perú – an area extended from Tumbes to Lima – is frequent in rural zones and peripheral urban areas settled by lower income families. The presence of the domestic duck in country and city households appears related, possibly since Pre-Columbian times, to its use as a central dish in family or collective feasts and special meals. In small towns, the breeding of native ducks can also be associated with the demand from restaurants that sell traditional dishes to local residents and visitors. The feeding of *Cairina* is based on vegetable scraps from the kitchen (whose use reduces the cost of Muscovy breeding) and grains based in processed anchovy *Engraulis ringens* Jenyns, 1842. The feeders are simple: a vessel of cement or plastic, or a reused blanket placed on the ground. While it is assumed domestic animals belong to the family, in practice the responsibility for and management of ducks fall to adults and frequently the women in charge of the home. Children and teenagers can cooperate in the care of the pen or patio. In periurban households and rural houses it is possible to find pens with dozens of ducks destined mainly for the family table; existence of larger *joque* groups is an indication of selling meat to restaurants and markets. The care of the ducks is a process that lasts until the animal reaches adulthood. The age of *joques* is determined in months, with wider ranges of young (*tierno*), mature (*maduro*) and old (*viejo*).

The pen (corral or patio), the multispecies environment also inhabited by humans – where taming, reproduction, and butchering of the *Cairina moschata* happens – is placed in the rear areas of houses and is delimited by caña brava (*Gynerium sagittatum* (Aubl.) P. Beauv., 1812), carrizo (*Phragmites australis* (Cav.) Trin. ex Steud., 1841), adobe, mats, or brick walls; in more informal cases, walls are made with rubble from other buildings (Fig. 5). A small *poza* or pond in the ground, a cut tire, or just a bowl are considered (but not always) essential to permit ducks to clean and refresh their bodies. In some towns irrigation channels are also utilized for that purpose – with caution to prevent the ducks from getting away from the house. Given the reduction of wetlands and riverine woodlands, feral *Cairina moschata* are infrequent on the north coast of Perú. Local wetlands, such as those at Etén, Cañoncillo, Chicama, Cerro Prieto, and Chimbote, are annually visited by migratory waterfowl. The importance of water supply is extended, to a lesser degree, to the *Gallus gallus* (Linnaeus, 1758) hen and chicks and turkeys *Meleagris gallopavo* Linnaeus, 1758 that also populate the pens. Partridge (*perdiz*), introduced in recent decades, due to the popularization of urban consumption of their eggs, is not commonly bred in rural areas of north coastal Perú. Geese are rare in the rural or periurban coastal pen. Campesino families from the coast can also raise Guinea pigs (*Cavia porcellus* (Linnaeus, 1758)), goats (*Capra hircus* Linnaeus, 1758) and sheep (*Ovis orientalis* Gmelin, 1774). Fighting cocks form a special category of domestic birds and are maintained separately from the ducks, especially the bellicose *joque* drakes.

Breeding areas for ducks – native or the *piquín* (Peking) *Anas platyrhynchos domesticus* Linnaeus, 1758 species introduced in the colonial period – are spaces of constant activity, attention, and expectation. The daily work of the people in charge of the pen includes bringing feed from the kitchen or market, filling or changing water in the *poza*, and removing excess scraps and excrement accumulated on the patio floor. It is equally important to separate the animals in fights and to prevent the entry of dogs into the patio – an event that risks months of effort and care. Trimming of wing feathers – or, more violently, pulling them out manually –, keeps the ducks from flying and abandoning the household. An adult *joque* with complete feathers can easily surmount a wall, ending up in a tree or falling into another pen. Identifying sick or ill (*pestosos*) animals to try to cure them or to isolate them is equally crucial. Impact of avian influenza virus on domestic populations of *Cairina moschata* in Perú has not been a subject of major analysis (Capua & Mutinelli 2001). Drakes that are especially independent or unruly can end their days tied by a cord from one of their feet to a stake or pole. A well-structured pen permits the separation of *joques* into small compartments, each one assigned to a dominant drake and a group of females and juvenile ducks. Adult male ducks should also be separated from rivals to avoid uncontrolled fights and physical harm.

Reproduction of *Cairina* begins when an adult drake courts – efficiently and sometimes violently – the closest females. In those moments the crest of drakes usually arises. The sexuality of *joque* drakes is recognized by their breeders. The erotic behavior of *joque* males is employed by breeders as a field rich in references and expressions about human sexuality. Copulation is called the *pisado* (stepping on) of the female duck. The drake – weighing three to five kilograms – mounted on his partner controls her through a combination of wing movements, weight, bites, and jabs with his beak and feet. The female duck enters upon a nesting period of five weeks – using available spaces (sometimes conditioned by the pen owner) for placing the nest. The hatching of a new generation of ducks delights breeders (and their children) and becomes an occasion for new opportunities and memories.

When the time comes – at ten weeks or older – to consume *Cairina moschata* at the family or commercial table, the condition of *tierno* (young) or *maduro* (old) of each specimen is examined; selected ones are sent to the slaughter area (nearby the corral), and the best reproductive females and drakes are separated. The duck – *joque* or *piquín* – is usually killed by cutting the neck with a knife; sometimes a brass funnel (nailed to a wall or attached to a wooden post) is used, within which the bird is placed head down. The funnel impedes the movement of the animal and eases both cutting the neck and draining the blood; the blood can be collected in a vessel, now commonly a bucket or a tin can, to be employed in the making of some dishes. Occasionally, the head and neck are simply twisted. The body, already inert, is submerged in boiling water, a step that makes it easier to remove feathers and *cañones* (hollow shafts or quills). An incision in the abdomen permits the removal of entrails. The timing of slaughter and



Fig. 6. — Seller of domestic birds in popular market, Trujillo (photo Jorge Gamboa).

pelado (feather removal) is normally early, sometimes in the first hours of the morning, in order to carry the bodies, clean and eviscerated, to the market stall. Killing and processing of domestic birds is an activity involving male and female owners or contracted personal (Fig. 6); selling the meat of the birds is mostly done by women.

Lean and red, *joque* meat is considered of hard consistency (*es mas durita*) in comparison to chicken. Texture and quality of meat from *Cairina* raised in household pens is appreciated and in demand, being judged superior to those of ducks permanently secluded in the reduced spaces of a *galpón* (large barn) and fed with industrially processed materials. The *molleja* (gizzard), heart, and bowels are destined for the preparation of traditional dishes. Places such as Chiclayo or Moche – but also Casma and downtown Lima – stand out for the number of popular restaurants offering *pato guisado* (stewed duck), *arroz con pato* (rice with duck), or *ceviche de pato*. *Joque* heads are not wasted, being cooked along with other animal parts. *Joque* feathers (grey, brown or dappled) are not used very much, but have been recognized among elements used for the ornamentation of precolonial textiles from the north coast of Perú (Rowe & O'Neill 1984). The family kitchen is, normally, the domain of adult and young women. In commercial kitchens, males can occupy principal roles; those restaurants provide a competitive ambiance for prestigious male and female cooks in constant demand.



FIG. 7. — Processed domestic bird bodies sold in Mayorista market, Trujillo (photos Jorge Gamboa). **A**, *Gallus gallus domesticus* (Linnaeus, 1758); **B**, *Cairina moschata* (Linnaeus, 1758).

prestigious male and female cooks are in constant demand. The strong taste and scent of native duck are qualities desired and enriched during the transformation of the animal flesh into human food (Fig. 7A, B).

Arroz con pato or *pato guisado* are special dishes based on the *presas* (cut up pieces of meat) served over white rice or a vegetable. *Presas* are preferably those of *joque*; *piquín* parts can be considered too small or lacking the right flavor. However, an expert cook can achieve with a *piquín*, or even a cormorant or guanay (*Phalacrocorax bougainvillii* Lesson, 1837) an equally attractive dish. Seasonings are cooked together with the *presas* or, in the case of yuca (*Manihot esculenta* Crantz, 1766) or beans, separately. The duck pieces are boiled in water to which is added oil or butter, onion, yellow or *panca* (reddish), *aji* (chili pepper), cilantro, garlic, beer or *chicha* (maize beer), salt, and pepper. Stewing the duck meat takes hours, with the head of the kitchen and her/his partners constantly testing the *jugo* (juice) and judging its *sazón* or *gusto* (taste). The traditional preference for using a wood-burning stove has diminished in cities because of the high cost of fuel and difficulty in procuring it. Clay cooking jars – the *ollas de barro* hand made in the highlands to the east of the coast – are famed for providing a better *sazón*, but are increasingly rare, due to a shorter lifetime, and have been replaced by metal cooking pots. The duck is presented, hot and steaming, on platters over a portion of rice with manioc, beans, salads, and ground spicy chili.

A duck meal is appropriate at midday and early afternoon. Serving meals at either the rural or urban family table generally follows the order of age and responsibilities: first the adults, next the older children, and finally the small children being

served. Pieces of meat are assigned according to the hierarchical position of each individual within the family but also according to the preferences of every home. The rural table and those of migrants to the city is a place for conversation and the enjoyment of music; it is not considered good manners to bring books, newspapers, or cellphones to the table – although the last are making their presence increasingly noticed. A family lunch often culminates with the appropriate *cumplidos* or words of appreciation to the cook and expressions of gratitude to the parents, or adults, in charge of the gathering. Serving the dishes, and their removal and washing, is normally a labor fulfilled by the mother and her daughters.

Cooking duck requires both experience and appreciation of traditional recipes and knowledge. Duck dishes are sold in popular restaurants, at a reasonable cost. The common perception is that these restaurants provide better quality and value, in contrast to larger, more expensive, restaurants that *sirven poco y caro* (serve little and dear). Consumption of *joque* (or alternatively the *piquín*) is an opportunity and motive for the awakening of the senses of taste and smell. Some people declare they feel passionate or sexually aroused after eating a *joque* meal (Victorino Tullumé pers. comm.). Use of *chicha* or beer in this *fuerte* (strong) food can provoke drowsiness and pleasure during and after ingestion. North and central coast populations of Perú pass down narratives of women carefully preparing duck meals to attract their partners or prevent the inattention of their husbands. The duck heart is a piece served to a lover or cherished person. Bones – or whatever remains of the bird after the meal – end up being provided to the dogs kept at home or at the restaurant.



FIG. 8. — *Cairina moschata* (Linnaeus, 1758) and turkey (*Meleagris gallopavo* Linnaeus, 1758) in Georgia, United States (photo Brian Brown).

In the rural world of the Peruvian coast *Cairina moschata* are raised with attention and even care but do not usually receive individual names or preferential attention. It is difficult to find in rural and migrant communities of the region the transformation of the domestic duck into a pet allowed to enter the areas of human rest and social life – this is different from the case of other animals raised for company and pleasure, such as parrots, monkeys, or dogs. Other traditional practices – increasingly disused – of the Peruvian coast involving the domestic duck went beyond its use for food. Carnival, the feastsdays of Christian saints, and festivities commemorating the founding of a town or city are times of community celebration enlivened with musical bands, plays, and toasting. Some festivities regularly celebrated until the 1980s in the peripheral districts of Trujillo included the *jalapato* or *jalagallos*, a social activity in which residents competed to catch a domestic bird tied to a rope lifted across the street – resembling in some respects the celebrations of *Kotz kaal pato* in Yucatán or the *Día del ganso* (Goose's day) in northern Spain – (Dueñas & Irigoien 1997: 134).

These communal feasting have, mostly, ceased to be carried out in urban areas but still take place in some rural sectors. In neighborhoods settled by migrants from the countryside, the *jalapato* was one of the cultural traditions of campesino origin now abandoned. The causes for that change were not uniform: in some cities preferences changed with the passing of a generation, but gender, level of education, or type of work

also were factors. In other cases the causes involved pressure from municipal authorities and environmental activists. The critical period of abandonment of *jalapato* in Trujillo was the 1990s, when collective celebrations that involved the death of a domestic bird stopped. The termination of that practice also appeared justified by the desire for better integration with, and acceptance by, the more central and economically better positioned zones of the city.

THE *CAIRINA MOSCHATA* IN NORTH AMERICA

Capacity of adaptation of the Neotropical *Cairina moschata* to ecosystems distinct from those of its initial domestication is surprising. Breeding of the Muscovy duck – the most common northern name of the domestic *Cairina* – became popular in the northern hemisphere during the last decades of the 20th century and the beginning of this century. Native crested ducks can be seen now in Central Park in New York as well as in fields, ponds, and farms from Georgia to Copenhagen and from Germany to Vietnam (Fig. 8). This expansion of *Cairina* habitats began in the middle of the 16th century, with the transatlantic travels of the domestic duck from indigenous America to Western Europe, but significantly increased at the end of the 19th century, when those birds entered with more impact on the tables, industries, and cultures of other continents.

MÉXICO

North America is an ideal place to examine the complex relationship between, first, the natural and anthropogenic distribution of *Cairina moschata*, and, second, the diverse ontological natures assigned to that bird in the present. México was a century ago the northern frontier of Muscovies. The *Cairina moschata* would have been introduced in México during the Colonial period (Corona 2002: table 9; Monterrubio-Rico 2006: 3). Wild populations of that species were found until the middle of 20th century in the tropical lowlands from both the Atlantic and Pacific Mexican shores, from Sinaloa and Tamaulipas to the Isthmus of Tehuantepec. Further south, from the Yucatán peninsula to eastern Honduras, the *Cairina moschata* also occupied the tropical forests, rivers and lagoons near the eastern and western littorals (Leopold 1959; Whitley 1973; Woodyard & Bolen 1984; Johnsgard 2010: 164, 165; 2017: 24, 25). In spite of that extensive original distribution, the loss of the mangrove and tropical forest ecosystems during last decades has placed the Mexican wild *Cairina moschata* in the path of extinction (Woodyard & Bolen 1984: 457; Feekes 2000). The number of surviving wild groups of our bird has not been yet established for México (Monterrubio-Rico 2006: 6).

Consumption of *Anas platyrhynchos* migratory ducks maintained in captivity was part of the Pre-Columbian Mesoamerican diet (Corona 2002: 110). The northern distribution of modern domestic, wild and feral populations of *Cairina moschata* would be the outcome of both the colonial introduction of that bird and recent natural and human processes (Stahl 2008: 121). While the presence of Muscovy (domesticated or captive) in Central México and other parts of Mesoamerica could correspond to a colonial and post-colonial process, this expansion should have been far of being conducted exclusively by the “Spaniards”; similar agents of diffusion could be the more numerous, and no less active, indigenous and mestizo populations of engaged regions. In fact, given the colonial resettlement processes and the constant legal and illegal traffic, human agents associated with the dispersion of *Cairina moschata* into México must have included people of indigenous, African, and creole ancestry.

The *pato real* is currently bred for human consumption in central México, in localities such as Teotihuacán and Ciudad de México, as well as Tlaxcala, Puebla, and Morelos (Elsa Díaz & Verónica Ortega pers. comm.). Breeding of *Cairina* takes place in pens together with chickens, *guajolotes* (turkeys) and the *pekinés* (Peking) ducks. Some specimens of the domestic Mexican Muscovies are also occasionally sold as pets for kids – not infrequently ending their lives in the mouth of a too curious dog. Camacho *et al.* (2011: 376-378), in addition to indicating the breeding in México of *Cairina moschata* as occasional and minor in comparison to other corral birds, provide a curious information. Traditional breeders used to deploy a duck as a companion of chicken, hens and *guajolotes*, under the belief the duck will protect the rest of the animals or will reduce the incidence of diseases. The authors suggest that conception could originate in the recognition of ducks as natural carriers of less mortal virus strains that, transmitted to other birds, provide them with crossed immunity against more aggressive serotypes.

Cairina moschata was the only duck species domesticated in America. However, other Neotropical waterfowl species were eventually raised in captivity. Severina Santiago Castillo (pers. comm.) from Juchitán de Zaragoza, in Tehuantepec, refers to the taming of the *pixixi* (*Dendrocygna autumnalis* Linnaeus, 1758) among modern Zapotec populations. *Dendrocygna autumnalis* has an extensive distribution from the southern United States to northern Argentina; remains of the *pixixil* whistling duck have been recorded, alongside *Cairina moschata* bones, in the Sierra site (300 BC-AD 500), a settlement of agriculturalists on the Pacific coast of Panama (Cooke 1981: 82; Cooke & Olson 1984). At Juchitán, Severina notes, the *pixixi* – also known as *pato silbón* or whistling ducks – are captured in lagoons, and afterwards are kept in captivity to guard the house from strangers as well as for its meat. A similar situation is described for Putla de Guerrero, in the Sierra Madre de Oaxaca, and El Espinal, near Juchitán, where the Mixtec and Zapotec families conserve the *pixixi* ducks in their corrals (after the trimming of wing feathers) to alert the presence of intruders. The impossibility of efficiently controlling their reproduction, forces the *pixixi* breeders to capture them periodically in the local wetlands (Aimée Fenochio Santos & Ricardo Martínez Cueto pers. comm.). *Muy bravos* (aggressive) and noisy, the *Dendrocygna autumnalis* tamed in the southern part of Mesoamerica are subject of a practice that could demonstrate the continuity, or reintroduction, of animal management strategies observed elsewhere (Whitley 1977: 174; Angulo 1998: 30-32).

UNITED STATES

In 1998 some groups of wild *Cairina moschata* were sighted in Texas; by 2010 those birds were regulars in the Rio Grande lower basin (Johnsgard 2017: 26) and several Gulf states. The current status in Texas of *Cairina* is “year-round resident” with reproductive capacity (Tucci 2001: 1, 3). Within the United States territory the *Cairina* occupy nature reserves, bodies of water, and reservoirs, and have shown a notable resilience to hurricanes and floods (Johnsgard 2017: 26, 27). Their territorial and demographic expansion has also made the Muscovy duck sightings for bird watchers. Expansion of the Muscovy duck in the United States is a fascinating phenomenon. Wild groups settle in riverine and wooded areas near farms where domestic specimens are kept; their coexistence gives origin both to a continuous genetic flux and the movement of specimens who abandon human domains to enter (or return to) the wild. At the same time, some domestic specimens can find themselves being the object of attention during hunting season.

The classic work by Paul Johnsgard (1975, 2010: 164) on North American wild waterfowl pointed out that occurrence of *Cairina moschata* in the territory of the continental United States did not exist in records going back decades before the publication of his work. That situation changed at the end of the 20th century. The same author mentioned the introduction of wild *Cairinas* from South America to Florida, another of the regions where the species spread and acquired a new status. The first documented record of *Cairina moschata* in Florida

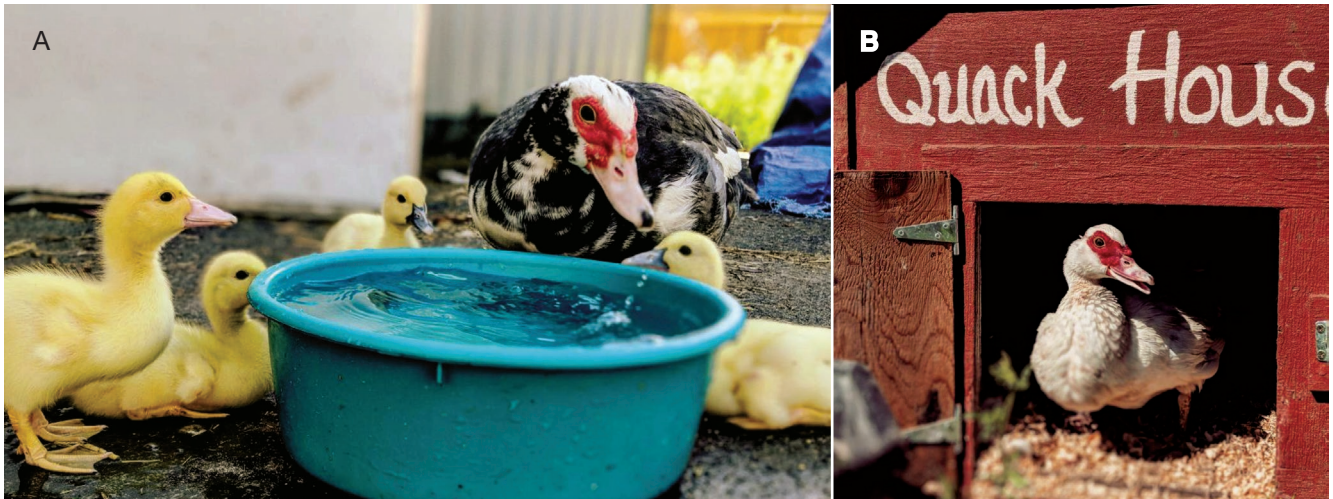


Fig. 9. — Domestic *Cairina moschata* (Linnaeus, 1758) in the United States (photos Sarah Fullerton): **A**, female Muscovy and ducklings; **B**, wooden nest box.

dates from 1967 (Johnson & Hawk 2012: 2). The proximity to human communities of some populations of *Cairina moschata* in the United States reveals the ambiguous nature of the "feral condition" officially assigned to the species. The reproduction of feral Muscovies happens outside of human control; nevertheless, it has been reported that the animals themselves seek to establish contact with human communities to obtain food – a situation that recalls the habituation and association stages that occurred during the early domestication of the species. To better understand these kinds of connections, we can examine the case of the "Sunshine State".

The introduction and spread of *Cairina moschata* in Florida is especially illustrative about the nature and effects of the feral expansion of that species in North America. *Cairina* ducks in Florida have the status of established non-native birds (Avery & Moulton 2007). The initial introduction of *Cairina* as an ornamental bird for urban parks and pools led to their reproduction outside of human control. In 2008–2009, in Naples, a city of 21 000 inhabitants, a population of 440 feral Muscovies was observed (Johnsgard 2017: 26); the exponential increase of wild or feral groups of *Cairina* was followed by hunting and protective measures (Ballou 2015). Some controversial aspects of the Muscovy expansion are the amount of excrement produced (with the consequent pollution of water sources) and the familiarization, not always harmonious, of *Cairina moschata* with human communities, as the ducks enter regularly into them to find food. Johnson & Hawk (2012: 2) described that situation: "Muscovy populations expand rapidly in urban areas, often becoming a nuisance. These large ducks are often *aggressive*, especially when accustomed to being fed, and may chase or attempt to bite children" (emphasis added). The same authors indicated "Muscovies are found in and around urban centers from New York southwest to Texas, and in Washington and California" (Johnson & Hawk 2012). What started as a purposeful and "supervised" introduction at specific locales terminated in a unrestrained growth that allowed the *Cairina*

to reach into urban centers and suburban areas of Oregon, Texas, the Mississippi basin, Kentucky, Alabama's coast, and the northeastern states from Tennessee to New York (Johnson & Hawk 2012: fig. 3).

The *Cairina moschata* can be also a symbol of undesired migration. An incessant immigrant, the feral Muscovy reached East Tennessee ten years ago. The spread of *Cairina moschata* in that state was not well received by some local inhabitants. An editorial expressed concern about the arrival of foreign animals and described them with the terms "ugly" and "monstrosities" (Davis 2008). The rhetorical approach in that newspaper was disturbing; a paragraph described wild Muscovies: "[...] they're very handsome with beautiful glossy green and purple feathers. But after generations of captive breeding for their meat [they] often look grotesque." The sense of the article was highlighted in the phrase "Muscovies mate with mallards to produce real weirdos", remarking that crossbreeding was an "inconvenient", or far from the correct path, idea. In another section, the author stated "Some muscovy ducks are so tame you can walk right up to them. In fact, they'll probably walk right up to you – anticipating you might have an edible treat to hand out", an ominous warning for the potential usefulness, and fate, of the invading species.

However, the Muscovy prevailed. That "success" is due in part to the activity of rural farms dedicated to the breeding and processing of domestic animals for food (Fig. 9A, B). The highest numbers of *Cairina moschata* farms can be found in Eastern and Midwest states and on the Pacific coast². Muscovies are raised along with other livestock for their meat (increasingly appreciated in local and national markets); another asset is that *Cairinas* control pests by foraging, thus eliminating or reducing the use of chemical pesticides. As in Perú and Europe, Muscovy farms in the United States are multispecies spaces (Rodenburg *et al.* 2005; Schollaert 2014). Never raise

2. <http://www.muscovyduckcentral.com/breedersmap.html>, last consultation: 29/07/2019.

a Muscovy in isolation (a lonely *Cairina moschata* will bond to its owner to the extreme of harassing him or her) is common advice that highlights the importance of the Muscovy's socialization with diverse humans and other animals.

The activities of these agricultural and breeding centers permitted the *Cairina moschata* to expand notably its geographical range in the United States and adapt to cold environments. Alison Rankin (pers. comm.), breeder of domestic birds from Newman Lake, Washington state, points out that Muscovies live well in places that are seasonally cold, but that under those conditions they need nocturnal heating and artificial light – this is to allow females to keep nesting. Alison noted that Muscovies acquire frostbite in feet more easily than other farmed birds; the risk of frostbite is related to the lack of nerves and blood vessels in that part of the body – a condition that permits *Cairina* to swim in freezing water but that, at the same time, causes foot injuries when exposed to low temperatures. Cassandra Everly (pers. comm.) from the Everly Preservation Center in Warrensburg, Missouri, also described how the raising of Muscovies is conducted in a rural region with snowy winters (Fig. 10); in that case and in the Newman Lake's one, the survival of the domestic crested duck depends in part on the care provided by humans. Both duck breeders, as well as Sarah Fullerton³, are active participants in the web communities dedicated to the *Cairina moschata*.

MUSCOVIES AND DIGITAL COMMUNITIES

The contemporary digital world is not exempt from attention to the uncanny *Cairina moschata*. Several sites on Facebook, such as Muscovy Ducks with 11397 members, Muscovy Duck Group with 3061, Muscovy Ducks (PETS) with 1739, and Muscovy Ducks – Beautiful Creatures with 1593 members (all in May 2019), involve a large number of participants exchanging information about these birds. Users of these digital sites are people who raise, consume, and admire the animals. However, distinct positions are held amongst them. For example, the site Muscovy Ducks – Beautiful Creatures states “This is a group for all who love these ducks and realize humans are uninformed. This group is intended for us to share our stories and pictures and to brainstorm ideas on how help and protect our little friends”. The most popular site, Muscovy Ducks, is open to all kinds of *Cairina moschata* and other duck breeders, both for nutritional purposes and for pets. These web sites from North America, still non-existent in Latin America and much less representative in Europe, facilitate the exchange of information on feeding, organization of pens, cooking, reproduction and sexuality, diseases, qualities, feather colors, and behaviors. A recurrent question is, “How to identify my young drakes from females?” These Facebook accounts have a strong base among duck breeders and allow for a daily, and frequently interactive, approach to the rural practices of the United States.

3. #oregonrootshomestead tag on instagram.

The extension and impact of breeder communities interacting daily and in real time on Facebook is increasing. The website Muscovy Breeder's Map⁴ shows the places of *Cairina moschata* farming in the countries of the global north and reveals the concentration of that activity in the United States and Western Europe. Some Muscovy owners may be found in latitudes as high as in Alaska. This website also serves as a forum for the selling of live animals and permits sellers to make contact with partners. The *Cairina moschata* is a species of domestic use recognized by the American Poultry Association⁵ and the Entente Européenne d'Aviculture et de Cuniculture⁶ – both active in mass media with users on either side of the Atlantic.

The differences in attitude among the United States urban or rural families about the domestic duck from indigenous America – an origin sometimes not known or considered – can be as diverse as in Perú or the rest of the southern hemisphere. Nevertheless, the activism of people who, as in the case of users of the site Muscovy Ducks (Pets), raise the *Cairina moschata* as a pet is evident and contrasts with the prevailing identification of Muscovies in the same country as a food source. This group states: “This site is for all duck lovers, but particularly Muscovy Ducks. Please *no talk of ducks for meat*. But egg, breeding, pet talk is more than welcome. Please feel free to ask advice or share your knowledge and most of all please use your manners. Thank you” (emphasis added), a warning directed to rural or suburban breeders seeking to save some Muscovies for a final fate at the knife's edge. Many of the themes about Muscovies consulted on this site are similar to those covered on the other web sites – except for the cooking recipes and ways of preserving the meat. This new form of breeding implies the selection of some animals to be protected, spoiled, and regularly photographed by their owners – a practice that, in order to be continued and spread, still requires the reproduction and sale of new specimens.

THE MESTIZO CAIRINA AND THE CONTROVERSY OF FOIE GRAS

The cross of *Cairina moschata* with other waterfowl species, either domesticated or wild and migratory, produces offspring; these however are infertile. The mulard, hybrids of *Cairina* and *Anas platyrhynchos domesticus* Linnaeus, 1758, are bred in industrial farms in the European Union, the United States, and China for the production – from their overfeeding (often times forced) – of *foie gras* and *pâté*. To achieve that goal, selected ducks and geese are confined in cages to restrict their movement and are fed, directly and rapidly, from a tube temporarily inserted into their beaks and esophagus. The process, which reduces time and costs but can produce lesions and asphyxia, leads the confined animal to grow an enlarged liver, which is enriched in fat (unsaturated, and with positive ef-

4. <http://www.muscovyduckcentral.com/breedersmap.html>, last consultation: 29/07/2019.

5. <http://www.amerpoultryassn.com/>, last consultation: 29/07/2019.

6. <http://www.entente-ee.com/en/>, last consultation: 29/07/2019.



FIG. 10. — *Cairina moschata* (Linnaeus, 1758) females and drake in Missouri, United States (photo Cassandra Everly).

fects on human blood cholesterol). Limitation of movement is accompanied by measures to avoid the regurgitation of inserted food. This form of breeding and feeding of geese and the *Cairina* duck has been the subject of constant legal and informal denunciation in Europe and North America by people who consider it to be animal abuse and the cause of (accidental) death of some birds. The reply to these protests by the meat industry, specifically D'Artagnan Foods Inc., was to claim, to the surprise and disbelief of some, that their birds were “hand-raised with tender care”.

The state of California prohibition, approved in 2004 but implemented only in 2012, of forced feeding for the making of foie gras continues in effect – the US Supreme Court rejected the latest appeal by producers in January 2019 – but is regularly challenged by producers, chefs, and restaurant owners. A similar regulation had been previously established in 2006 in Chicago (on the basis of animal cruelty), thus converting foie gras into an illicit substance; that same year, after criticism by producers, sellers, and Chicago's own mayor – and numerous civil disobedience demonstrations –, the legal disposition was lifted. In 2014, the Ministry of Commerce and Industry of India forbade the importation of foie gras to that Asian nation. In 2015, production and sale of foie gras was officially prohibited in the state of São Paulo – two years later, that regulation would be revoked by the city's Justice Tribunal; opposition was headed by various institutions, among them the National Association of Restaurants

of Brazil. Debate continues, with the small scale Muscovy meat producers from the Northern Hemisphere and other regions as attentive interlocutors (Fig. 11A, B; Davey 2006; Friedland 2009; Shantanu 2014; Edme 2016). Forced feeding of domestic duck occurs sporadically in rural and urban Perú but in these cases it is carried out manually and infrequently.

BIOLOGICAL AND BEHAVIORAL FOOTPRINTS OF DOMESTICATION

The imprint of domestication on birds and mammals is deeper than we tend to believe. Cerebral volume of domestic birds, just like in other animals tamed by humans since the Neolithic, has been established to be inferior than that of their ancestors and wild relatives; in ducks and geese that decrease is estimated at 16%, reaching to 29% in turkeys (Zeder 2012: 232, fig. 9.3). For Zeder, that reduction is related to changes in the limbic brain that controls emotional reactions and the reorientation, or reduction, of aggressive, feeding, and mating/reproduction behaviors; the author noted that “the profound reduction in the size of structures within the limbic system in domestic animals can, then, be directly tied to raising the behavioral thresholds for the display of such behaviors as aggression, fear, and flight resulting in an overall reduction of emotional reactivity that is the keystone behavioral attribute of domestic animals” (Zeder 2012: 235). However, domestication should not be viewed as

an evolutionary regression; for Zeder (2012: 236) that process produced “highly successful adaptations to captive environments”. Freed, domesticated species do not easily recover a cerebral mass comparable to the “original” one (Zeder 2012: 238, citing the cranial volume of dingo and domestic dogs). However, domestication should not be seen as an evolutive regression. Research by Künzl *et al.* (2003) in domestic (*Cavia porcellus* (Linnaeus, 1758)) and wild (*Cavia aperea* Erxleben, 1777) Guinea Pigs suggests, on the other hand, that captivity by itself does not explain all the manifestations of profound alteration in animal behavior. These issues are important for studies in animal domestication in the Andes and elsewhere in America. Measurement of cranial volume is, albeit with a degree of caution, an anatomical feature potentially useful for future analyses oriented to distinguishing domestic, feral, and wild variants of the *Cairina moschata*.

CONCLUSIONS

Human society could not be understood without taking into account the role of animals with which “we” co-habit, especially those raised, through their existence and death, to provide life to owners. The life of the *Cairina moschata* duck has changed, in various ways, into a wide field of meanings and behaviors turning into events and memories – and of living bodies converted into food, trophies, or status symbols. As we have seen, the traditional raising of this animal can reflect modest socioeconomic status; consumption of the same species, on the other hand, varies from being an indication of festive and sensorial alterity of daily life to, in its more refined forms, being an indication of belonging to, or at least rubbing shoulders with, the privileged classes. The ecology of the *Cairina* is one shared, or co-created, with humans. This situation has produced a forced symbiosis between both species. The question still left up in the air is if humans have given rise to a new creature through the domestication of *Cairina moschata*. The Muscovy shows itself to be an animal in constant movement, either under human control or free of it. In the latter case, feral *Cairina* have established a parallel, and entangled, relationship with their former master that distinguishes them from their domestic cousins (and their permanently endangered lives). In contrast to the relationships between *Homo sapiens* and other primates – in which shared senses and capacities are seen and experienced – links among humans and domestic birds rest on unequal (although superimposed) ontological ground. At the same time, it is evident, as Muscovy breeders from Perú to the United States can attest, that animals also inspect, recognize, and reorient the behaviors of their human owners.

It is possible to think of an interspecies dependence. Nevertheless, spread of *Cairina moschata* in North America contradicts that model in part. Once freed, the Muscovy duck does not depend – except in extreme environments and situations – on humans to survive. Van Dooren & Rose (2016: 80) stated “[...] ways of being are not formed and sustained in isolation [...]”. Our analysis permitted us to recognize the diversity of the current human experience (and the wealth of histories) developed around the

Cairina moschata. Breeding and management of these animals in diverse regions of the globe demonstrate shared expressions of dependence and utilization managed by humans on an animal adaptable by nature. Certain human behaviors in respect to domestic ducks may be considered the expression of a symbiosis, legitimated by time and experience, between the nurtured animal and the human consumer. Nevertheless, some of these same practices are considered cruel or inappropriate both for the animals and persons involved in them; in this postmodern perspective, the industrialized breeding and forced feeding aimed to satisfy a sophisticated market, or the violent death of domestic birds during a festival, are seen as ethical transgressions to be shunned. Those complaints about certain aspects of the farming and use of domestic ducks have been raised, in equal parts, in Perú, India, the United States, and recently China. However, the scenario is not as simple as it might seem.

It is common in the rural world to find sincere expressions of care and worry on the part of breeders for the animals that they raise and on which their economy and sustenance depends. The American domestic duck is recognized by its owners, whether in Perú, Missouri, or Belgium, as a clever and intelligent being, full of resources and able to learn and adapt behaviors. Urban consumers, largely disconnected from the realities of animal husbandry, are further from those experiences; they prefer to enjoy the experience of consuming the meat of the domesticated duck, as in the form of *pato guisado* from the Peruvian coast or *foie gras* in France. Urban populations are also the ones who have led a highly critical approach to rural breeding and urban celebratory practices that are considered excessively violent. The urban rejection of those activities, which are especially visible on the Peruvian coast, resulted in turning them into “outdated” and socially discredited practices. Confrontation by activists of the *foie gras* and *pâté* industries – economically influential and politically well connected – has had varied and less successful results.

But the *Cairina moschata* also possesses an agency and, considering its performative, cognitive, and behavioral capacities, its own ethos (Van Dooren & Rose 2016: 80, 81). Introduced by humans and now a problematic agent trespassing from natural areas into human settlements, the *Cairina* can exhibit, as in Florida, a rapid population increase able to provoke control actions that range from not providing food to the animals in urban areas to locating the nests and shaking the eggs “to render them unviable” or replacing them with plastic copies (Johnson & Hawk 2012: 3). Sympathy between *Cairina* and some people leads to the adoption of birds as companions welcome at home rather than in the pen. Breeding of Muscovies as pets also becomes, through neglect, abandonment, or release of the birds, a source of new feral or semi-domestic cohorts of the birds. Other affects befall the human agents involved. As mentioned by Arends (2008: 10, 11) for the Netherlands, the closing of family farms producing domestic ducks, either those native to the New World or to the Old World, reflects the ups and downs of the market; these economic and social crises also highlight the capacity to adapt and change on the part of small producers, who are the first to feel the impact of industrialized farming or environmentalist complaints.



FIG. 11. — **A**, logo of D'Artagnan Foods Inc. Image via Wikimedia Commons; **B**, poster of campaign to stop the expansion of *foie gras* industry in China (<https://safarus.wordpress.com/2012/03/24/chinese-activists-call-for-boycott-of-the-largest-foie-gras-farm>, last consultation: 06/09/2019).

To examine the modern roles of the *Cairina moschata* duck means also to observe multiple ontologies formed by constant and dynamic interactions between an animal species and humans. At the same time, it is possible to observe a series of socioeconomic correlates that tell us more about the people in charge of those birds. In Perú, non-industrialized breeding of *joque* *Cairina moschata* is an activity usually involving citizens from campesino origin or with lower incomes. While consumption of the *joque* reaches a wide number of social groups, including the most privileged, the socio-economic level of traditional breeders usually ranges from precarious to modest or middle class – a condition associated frequently with mestizo or indigenous ethnicities and rural and urban migrant locations. In the United States, Muscovy/*Cairina moschata* husbandry is practiced by the middle and lower rural classes. The internet has an important role in the public and political representation of North American breeders. Latin America still lacks web communities created around the image, flesh, and agency of the *Cairina*. These distinct forms of access and use of digital media are meaningful in their own right.

The image of the Muscovy becomes almost a symbol of rurality in North America, whose small-scale farmers, in the words of Cassandra Everly (pers.comm.), “can’t compete with industry farmers”. In Latin America, modern breeders of the bird domesticated millennia ago by indigenous societies belong, usually, to lower classes still reluctant to use the internet as a platform for the expression of their identity. Despite those differences, the attachment to the rural world and the desire to interact equally or at least on better terms with the city characterize both traditional and non-industrialized farmers from Latin America and the United States.

Fear of undesired immigrants – implicitly human – may be found in some commentary on the spread of *Cairina moschata* in the northern hemisphere. Modern ontologies of *Cairina* duck stand as highly dynamic and charged with symbolism. Critics to

practices ranging from the overfeeding of mulards to the *jalapato* (and the *Kotz kaal pato*) games have cast those activities as examples of the “dehumanization” of human societies. The relationships between humans and animals often situate the animals as captive subjects. Let’s go back to the argument outlined above. Rural or peripheral urban families breeding *joques/muscovies* for human consumption may develop deep bonds of attention with their domestic birds, defending them from predators and providing them quality food. Urban and rural dwellers that keep domestic ducks as pets – a condition oriented in part for their own pleasure – come to establish affectionate ties with their birds through prolonged contact; the denial of freedom for the birds is, however, an unavoidable factor. Both trends may be seen also as embedded in long-term relationships, sometimes of millennia, as on the Peruvian north, or centuries, for the *Cairina moschata* introduced into Europe at the end of the Renaissance – between people and the waterfowl species first domesticated in America. The association among domesticated/feral/wild *Cairina* and human beings will continue in coming years, but (just as it has always done) it will undoubtedly take new paths.

Acknowledgements

I warmly thank the many people who helped me to produce this paper. Sra. Severina Santiago Castillo and archaeologists Elsa Díaz, Aimée Fenocho Santos, Ricardo Martínez Cueto, Cira Martínez López, Verónica Ortega, Robert Markens, and Eladio Terreros, provided valuable data on breeding of Muscovies and *pixixi* ducks in México. In Perú, research benefited from the support of archaeologist Victorino Tullumé (Lambayeque), Sra. Maruja Velásquez Cipra (Trujillo), Sra. Alcira Sachún (Chan Chan), and Srs. Adrián Villón, Manuel Escobar, and Germán Lluptón (Nepeña). Sarah Fullerton, Cassandra Everly, and Alison Rankin (United States) provided their knowledge and experience about breeding *Cairina moschata*,

as well as amazing photos. Two outstanding photographers, Shirley Freyre Mauny, in Perú, and Brian Brown, historian and recorder of rural architecture from Fitzgerald, Georgia, generously provided some of the images included in this article. Lucy Apaesteguí and Ely Irigoien were the best partners during the field research conducted in the Trujillo markets and duck farms. María Firmino-Castillo, Rainer Hostnig, David Pacifico, Sarah Scher, Norbert Schollaert, John Topic, Aldo Watanave, and Enrique Zavaleta were always a source of references and friendship. Alexia Moretti was kind enough to translate the abstract into French. Finally, I would like to thank the editors and the anonymous peer reviewers of *Anthropozoologica* for helping me to improve the manuscript and put it into final form for publication.

REFERENCES

- ANGULO E. 1998. — Interpretación biológica acerca de la domesticación del pato criollo (*Cairina moschata*). *Bulletin de l'Institut français d'Études andines* 27 (1): 17-40.
- ARENDS G. 2008. — The history of duck keeping in the Netherlands. *Aviculture-Europe* 4 (5), 11 p. <http://www.aviculture-europe.nl/nummers/08e05a13.pdf>, last consultation: 29/07/2019.
- AVERY M. L. & MOULTON M. P. 2007. — Florida's non-native avifauna, in WILMER G. W., PITT W. C. & FAGERSTONE K. A. (eds), *Managing Vertebrate Invasive Species: Proceedings of an International Symposium, Fort Collins, Colorado, August 7-9 2007*. National Wildlife Research Center, Fort Collins: 365-377.
- AVILEZ J. P. & CAMIRUAGA M. F. 2006. — *Manual de crianza de patos*. Universidad Católica de Temuco, Temuco, 82 p.
- BALLOU B. 2015. — Feed 'em or fight 'em: Muscovy duck wars rage on. *South Florida Sun Sentinel*, June 10.
- BANGA-MBOKO H., LELOU B., MAES D. & LEROY P. L. 2007. — Indigenous Muscovy ducks in Congo Brazzaville. 2. Preliminary observations on indigenous Muscovy ducks reared under moderate inputs in Congolese conditions. *Tropical Animal Health and Production* 39 (2): 123-129.
- BELON P. 1555. — *L'Histoire de la nature des oyseaux, avec leurs descriptions et naïfs portraits retirez du naturel, écrite en sept livres*. G. Corrozet, Paris, [400] p.
- BENSON E. 1976. — "Salesmen" and "sleeping" warriors in Moche art. *Actas del 41 Congreso Internacional de Americanistas, México, 2 al 7 de septiembre de 1974*. 2: 26-34.
- CAMACHO M. A., LEZAMA P. N., JEREZ M. P., KOLLAS J., VÁSQUEZ-DÁVILA M. A., GARCÍA-LÓPEZ J. C., ARROYO-LEDEZMA J., ÁVILA-SERRANO N. Y., & CHÁVEZ-CRUZ F. 2011. — Avicultura indígena mexicana: sabiduría milenaria en extinción. *Actas Iberoamericanas de Conservación Animal* 1: 375-379.
- CAPUA I. & MUTINELLI F. 2001. — Mortality in Muscovy ducks (*Cairina moschata*) and domestic geese (*Anser anser* var. *domestica*) associated with natural infection with a highly pathogenic avian influenza virus of H7N1 subtype. *Avian Pathology* 30 (2): 179-183. <https://doi.org/10.1080/03079450120044597>
- COOKE R. 1981. — Los hábitos alimentarios de los indígenas precolombinos de Panamá. *Revista Médica de Panamá* 6: 65-89.
- COOKE R. & OLSON S. 1984. — An archaeological record for the white-faced whistling-duck (*Dendrocygna viduata*) in Central Panama. *The Condor* 86 (4): 493-494. <https://doi.org/10.2307/1366841>
- CORONA E. 2002. — *Las aves en la historia natural novohispana*. Instituto Nacional de Antropología e Historia, México DF, 187 p.
- CRAWFORD R. 1992. — Introduction to Europe and diffusion of domesticated turkeys from the America. *Archivos de Zootecnia* 41 (154): 307-314.
- DAVEY M. 2006. — Defying law, a foie gras feast in Chicago. *The New York Times*, August 23. <https://www.nytimes.com/2006/08/23/us/23chicago.html>, last consultation: 29/07/2019.
- DAVIS M. 2008. — Davis: Ugly immigrants find East Tennessee to their liking. *Knoxnews* Nov. 1. <http://archive.knoxnews.com/entertainment/life/davis-ugly-immigrants-find-east-tennessee-to-their-liking-ep-410823121-359722821.html>, last consultation: 29/07/2019.
- DONKIN R. 1989. — *The Muscovy Duck, Cairina moschata domestica: Origins, Dispersal, and Dissociated Aspects of the Geography of Domestication*. A. A. Balkema, Rotterdam-Brookfield, viii + 186 p.
- DRIESCH A. VON DEN & HUTTETER R. 2012. — Mazamas, patos criollos, y anguilas de lodo: restos de subsistencia del asentamiento precolombino "Loma Salvatierra", Llanos de Mojos, Bolivia. *Zeitschrift für Archäologie Außereuropäischer Kulturen* 4: 341-367.
- DUEÑAS E. X. & IRIGOIEN I. 1997. — La fiesta, recuerdos y vivencias: entorno festivo en la historia de la villa marinera de Lekeitio. *Biblid* 15: 101-139.
- EDME B. 2016. — Lei que proíbe o foie gras é derrubada em decisão final do Tribunal de Justiça. *Folha de São Paulo*, February 26.
- EITNIEAR J., ARAGÓN-TAPIA A. & BACCUS J. 1998. — Unusual nesting of the Muscovy Duck *Cairina moschata* in northeastern Mexico. *Texas Journal of Science* 50: 173-175.
- FECKES F. 2000. — Pato real (*Cairina moschata*), in CEBALLOS G. & MÁRQUEZ VALDELAMAR L. (eds), *Las aves de México en peligro de extinción*. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad: Fondo de Cultura Económica, Mexico DF.
- FRIEDLAND J. 2009. — Foes of foie gras challenge: how it's advertised. *The Food Section*, January 27. <https://www.thefoodsection.com/foodsection/2009/01/foie-gras.html>, last consultation: 29/07/2019.
- GAMBOA J. 2017. — El pato, la chicha, y la fiesta: representaciones visuales y simbolismo de los ánades domésticos y silvestres entre los Moche. *Nawpa Pacha* 37 (2): 111-131. <https://doi.org/10.1080/00776297.2017.1388687>
- GESSNER J. K. 1560. — *Icones avium omnium quae in historia avium Conradi Gesneri describuntur cum nomenclaturis singulorum latinis, italicis, galicis et germanicis plerunque, per certos ordines digestae*. Froschoverus, Tiguri, 207 p.
- HARAWAY D. 2008. — *When Species Meet*. University of Minnesota Press, Minneapolis, 440 p.
- HESSE B. 1980. — Archaeological evidence for Muscovy duck in Ecuador. *Current Anthropology* 21 (1): 139-140. <https://doi.org/10.1086/202424>
- HUANG J. F., PINGEL H., GUY G., ŁUKASZEWCZ E., BAÉZA E. & WANG S. D. 2012. — A century of progress in waterfowl production, and a history of the WPSA Waterfowl Working Group. *World's Poultry Science Journal* 68 (3): 551-563. <https://doi.org/10.1017/S0043933912000645>
- JOHNSGARD P. A. 1965. — Tribe Cairinini (Perching Ducks), in JOHNSGARD P. A., *Handbook of Waterfowl Behavior*. Cornell University Press, Ithaca: 97-125.
- JOHNSGARD P. A. 1975. — *Waterfowl of North America*. Indiana University Press, Bloomington, 575 p.
- JOHNSGARD P. A. 2010. — Perching ducks Tribe Cairinini, in JOHNSGARD P. A., *Waterfowl of North America, Revised Edition*. University of Nebraska, Lincoln: 161-180. <http://digitalcommons.unl.edu/biosciwaterfowl/10/>, last consultation: 16/07/2019.
- JOHNSGARD P. A. 2017. — The North American perching and dabbling ducks: their biology and behavior. *Zea E-Books* 53, 231 p. <http://digitalcommons.unl.edu/zeabook/53/>, last consultation: 16/07/2019.
- JOHNSON S. & HAWK M. 2012. — Florida's introduced birds: Muscovy duck (*Cairina moschata*). *WEC Fact Sheet* 254.
- KÜNZL C., KAISER S., MEIER E. & SACHSER N. 2003. — Is a wild mammal kept and reared in captivity still a wild animal? *Hormones and Behavior* 43 (1): 187-196. [https://doi.org/10.1016/S0018-506X\(02\)00017-X](https://doi.org/10.1016/S0018-506X(02)00017-X)

- KIRKSEY S. E. & HELMREICH S. 2010. — The emergence of multispecies ethnography. *Cultural Anthropology* 25 (4): 545-576. <https://doi.org/10.1111/j.1548-1360.2010.01069.x>
- KOHN E. 2007. — How dogs dream: Amazonian natures and the politics of transspecies engagement. *American Ethnologist* 34 (1): 3-24. <https://doi.org/10.1525/ae.2007.34.1.3>
- LEOPOLD A. S. 1959. — *Wildlife of Mexico: The Game Birds and Mammals*. University of California Press, Berkeley, 600 p.
- MARTÍNEZ-LIRA P. & CORONA E. 2006. — Possible co-existence of two species of genus *Meleagris* at Monte Albán, Oaxaca. *Journal of Archaeological Science Reports* 10: 632-639. <https://doi.org/10.1016/j.jasrep.2016.07.028>
- MONTERRUBIO-RICO T. C. 2006. — Ficha técnica de *Cairina moschata*, in ESCALANTE P. (ed.), *Fichas sobre especies de Aves incluidas en el Proyecto de Norma Oficial Mexicana PROY-NOM-ECOL-2000. Parte 2*. UNAM, Instituto de Biología, México DF, 9 p.
- NARBAIZA I. 2008. — *Aumente la producción de Pato Real* (*Cairina moschata*). Academia de Ciencias Físicas, Matemáticas y Naturales, FODECI y Gobierno Bolivariano de Venezuela, Caracas, 43 p.
- ORTIZ DE LA PUENTE J. 1952. — Los patos del Perú. *Pesca y Caza* (4): 3-20.
- PHILLIPS J. C. 1922-1926. — *A Natural History of the Ducks*. Houghton Mifflin, Boston, 3 vol. <https://doi.org/10.5962/bhl.title.52316>
- PRÜMERS H. 2002. — Excavaciones arqueológicas en Pailón (depto. De Sta. Cruz, Bolivia). *Beiträge Allgemeinen Vergleichenden Archäologie* 22: 95-213.
- PRÜMERS H. & WINKLER W. 1997. — Archäologische Untersuchungen im Bolivianischen Tiefland. Erster Bericht des Projektes Grigotá [Excavaciones arqueológicas en las tierras bajas bolivianas. Primer informe del proyecto Grigotá]. *Beiträge zur Allgemeinen und Vergleichenden Archäologie* 17: 343-393.
- RODENBURG T., BRACKE M., BERK J., COOPER J., FAURE J., GUÉMENÉ D., GUY G., HARLANDER A., JONES T., KNIERIM U., KUHN T., PINGEL H., REITER K., SERVIÈRE J. & RUIS M. 2005. — Welfare of ducks in European duck husbandry systems. *World's Poultry Science Journal* 61 (4): 633-646. <https://doi.org/10.1079/WPS200575>
- RODRÍGUEZ C. 1992. — Étude archéozoologique du site inca Potrero-Chaquiago: quartier Retambay, Andalgala, Pcia. de Catamarca, Argentine. Mémoire de DEA Environnement et Archéologie, Université Panthéon Sorbonne, Paris.
- ROSE D. B., VAN DOOREN T., CHRULEW M., COOKE S., KEARNES M. & O'GORMAN E. 2012. — Thinking through the environment, unsettling the humanities. *Environmental Humanities* 1: 1-5.
- ROWE A. & O'NEILL J. 1984. — *Costumes and Featherwork of the Lords of Chimor: Textiles from Peru's North Coast*. The Textile Museum, Washington DC, 190 p.
- SCHOLLAERT N. 2014. — Muscovy duck colour genetics. *Aviculture-Europe* 14 (6), 12 p. <http://www.aviculture-europe.nl/nummers/14E06A08.pdf>, last consultation: 16/07/2019.
- SHANTANU D. 2014. — India bans import of foie gras; are Indian chefs happy? *The Indian Express*, July 9. <https://indianexpress.com/article/lifestyle/food-wine/cooked-the-geese/>, last consultation: 29/07/2019.
- STAHL P. 2008. — Animal domestication in South America, in SILVERMAN H. & ISBELL W. (eds), *The Handbook of South American Archaeology*. Springer, New York: 121-130.
- STAHL P. & NORTON P. 1987. — Precolumbian animal domesticates from Salango, Ecuador. *American Antiquity* 52 (2): 382-391. <https://doi.org/10.2307/281791>
- STAHL P., MUSE M. & DELGADO F. 2006. — New evidence for pre-Columbian Muscovy duck *Cairina moschata* from Ecuador. *Ibis* 148 (4): 657-663. <https://doi.org/10.1111/j.1474-919X.2006.00564.x>
- TU J., SI F., WU Q., CONG B., XING X. & YANG F. H. 2014. — The complete mitochondrial genome of the Muscovy duck, *Cairina moschata* (Anseriformes, Anatidae, Cairina). *Mitochondrial DNA* 25 (2): 102-103. <https://doi.org/10.3109/19401736.2013.784756>
- TUCCI T. 2001. — *On the Waterfowl of Texas: Ducks, Geese and Swans*. Texas Parks and Wildlife, Austin, 16 p.
- UCEDA S. 1997. — El poder y la muerte en la sociedad Moche, in UCEDA S., MUJICA E. & MORALES R. (eds), *Investigaciones en Huaca de la Luna, 1995*. Universidad Nacional de Trujillo, Trujillo: 177-188.
- VAN DOOREN T., KIRKSEY S. E. & MÜNSTER U. 2016. — Multispecies studies: cultivating arts of attentiveness. *Environmental Humanities* 8 (1): 1-23. <https://doi.org/10.1215/22011919-3527695>
- VAN DOOREN T. & ROSE D. B. 2016. — Lively ethnography: storifying animist worlds. *Environmental Humanities* 8 (1): 77-94. <https://doi.org/10.1215/22011919-3527731>
- WETMORE A. 1956. — The Muscovy duck in the Pleistocene of Panamá. *Wilson Bulletin* 68 (4): 327.
- WHITLEY G. R. 1973. — The Muscovy duck in Mexico. *Anthropological Journal of Canada* 11 (2): 2-8.
- WHITLEY G. R. 1977. — *Utilization of Certain Tame Birds in the New World in Pre-Columbian Times: a Dissertation*. Xerox University Microfilms, Ann Arbor.
- WOODYARD E. R. & BOLEN E. 1984. — Ecological studies of muscovy ducks in Mexico. *Southwestern Naturalist* 29: 453-461. <https://doi.org/10.2307/3670998>
- YAKUBU A. 2013. — Characterisation of the local Muscovy duck in Nigeria and its potential for egg and meat production. *World's Poultry Science Journal* 69 (4): 931-938. <https://doi.org/10.1017/S0043933913000937>
- ZEDER M. A. 2012. — Pathways to animal domestication, in GEPTS P., FAMULA T. R., BETTINGER R. L., BRUSH S. B., DAMANIA A. B., MCGUIRE P. E. & QUALSET C. O. (eds), *Biodiversity in Agriculture: Domestication, Evolution, and Sustainability*. Cambridge University Press, Cambridge: 227-259. <https://doi.org/10.1017/CBO9781139019514.013>

Submitted on 7 March 2019;
accepted on 27 June 2019;
published on 27 September 2019.